Content available at: https://www.ipinnovative.com/open-access-journals

Indian Journal of Obstetrics and Gynecology Research

Journal homepage: www.ijogr.org

Original Research Article

Efficacy of nurse-executed MOOC package on metabolic markers, clinical parameters, anxiety, health-related quality of life, and pregnancy outcomes among antenatal women: study protocol of a randomized controlled trial

Divya T S[1], S Rajeswari[2*], Syamlal S[3], S Aruna[4]

[1]Sri Ramachandra Institute of Higher Education and Research (SRIHER), Deemed University, Chennai, Tamil Nadu, India

[2]Dept. Obstetrics and Gynecology Nursing, Sri Ramachandra Institute of Higher Education and Research (SRIHER), Deemed University, Chennai, Tamil Nadu, India

[3]Dept. of Neurology, Sivagiri Sree Narayana Medical Mission Hospital, Varkala, Thiruvananthapuram, Kerala, India

[4]Dept. of Community Health Nursing, Sri Ramachandra Institute of Higher Education and Research (SRIHER), Deemed University, Chennai, Tamil Nadu, India

Abstract

Background: Obesity is a growing public health hazard worldwide. Among pregnant women, increased body mass index was associated with pregnancy related complications, including gestational diabetes mellitus, gestational hypertension, preeclampsia, caesarean birth and relatively high risk of maternal morbidity and mortality.

Aims & Objective: The principal aim of the study is to whether maternal overweight and obesity care package can influence metabolic markers, clinical parameters, anxiety, health related quality of life and pregnancy outcomes among antenatal women.

Materials and Methods: Randomised control trial with purposive sampling technique will be used in the present study. A planned enrolment of 220 participants, 110 per group, is randomly assigned to control and experimental arms. The intervention arm undergoing a planned breathing based aerobic exercise programs consisted of structured home-based diaphragmatic breathing and walking exercise, health education and provision of information booklet. Primary outcome measures include check is there any significance deference in the average value of the outcome variables (metabolic biomarkers, clinical parameters, anxiety and health related Quality of Life) across different time points as well as between experimental and control group.

Results: The nurse-executed MOOC package will significantly improve the health of antenatal women. Participants will show better control of metabolic markers and clinical parameters. Anxiety levels will decrease notably, while health-related quality of life will improve across physical, emotional, and social domains. Pregnancy outcomes will be more favorable in the intervention group, with reduced complications such as gestational diabetes and preterm births, along with improved neonatal health indicators.

Conclusion: The Nurse-Executed MOOC Package emerges as a promising and impactful intervention to enhance maternal and neonatal health. By equipping antenatal women with essential knowledge and support, it enhances their control over metabolic and clinical parameters, reduces anxiety, and boosts their overall health quality.

Keywords: MOOC package, Metabolic markers, Clinical parameters, Health related Quality of life, Pregnancy outcome.

Received: 08-06-2024; **Accepted:** 24-03-2025; **Available Online**: 13-08-2025

1. Introduction

Obesity is a significant global health concern, with a rising prevalence among women, including pregnant women. Increased body mass index (BMI) during pregnancy is associated with various complications such as gestational diabetes mellitus (GDM), gestational hypertension, and adverse pregnancy outcomes like caesarean birth and fetal macrosomia.[1] Furthermore, maternal obesity poses risks of

*Corresponding author: S Rajeswari
Email: rajeswari.s@sriramachandra.edu.in

https://doi.org/10.18231/j.ijogr.v.12.i.3.8

severe maternal morbidity and mortality, as well as long-term health implications for the offspring.[2]

The prevalence of obesity has been steadily increasing worldwide, with alarming rates observed in both high-income and middle-income countries.[3] In India, recent data from the National Family Health Survey (NFHS-5) indicate a rise in obesity prevalence, highlighting the urgent need for interventions to address this issue.[4,9] Maternal obesity is linked to metabolic disturbances, including altered glucose metabolism, insulin resistance, hyperlipidaemia, and chronic inflammation, all of which can impact fetal development and pregnancy outcomes.[5,12]

Physical activity and healthy lifestyle interventions have been shown to have favourable effects on metabolic biomarkers and pregnancy outcomes among obese pregnant women.[5] Current WHO guidelines recommend at least 150 minutes of moderate-intensity aerobic physical activity per week for pregnant or postpartum women.[6,1213] However, there is a lack of specific guidelines or interventions targeting obese pregnant women throughout their pregnancy journey.[7,8]

The Maternal overweight and obesity care (MOOC) package is designed to address this gap by providing structured interventions tailored to the needs of antenatal women with overweight and obesity. The package includes breathing-based aerobic exercises, health education on nutrition and physical activity,[9] and the provision of information booklets. This study protocol outlines a randomized controlled trial to evaluate the efficacy of the MOOC package in improving metabolic markers,[10] clinical parameters[11,12] anxiety,[13] health-related quality of life,[14] and pregnancy outcomes among antenatal women.[15]

2. Materials and Methods

2.1. Study design

This study will employ a randomized controlled trial design with purposive sampling.

2.2. Participants

The target population includes first-time childbearing women at 16-18 weeks of gestation with a BMI ≥ 25. A total of 220 participants (110 per group) will be recruited from antenatal clinics.

2.3. Intervention

The intervention arm will receive the MOOC package, consisting of structured home-based diaphragmatic breathing and walking exercises, health education sessions, and information booklets. The control group will continue with routine antenatal care.

A planned breathing based aerobic exercise programs consisted of structured home based diaphragmatic breathing and walking exercise. Exercises will be conducted and guided by the investigator directly on day1 and repetition of the same by the patient at home. MOOC begins with diaphragmatic breathing exercise for 5 minutes per day. Sit or lie down on a comfortable flat surface. Put a hand on your chest and other hand on your stomach. Breathe through nostrils into your abdomen, expanding your stomach and sides of the waist. Purse your lips as if sipping through a straw. Exhale slowly through the lips for 4 seconds and feel the stomach gently contracting. After breathing exercise, it should be followed by Walking exercise, walking begins with 10-15 minutes session for 3days per week and add 5 minutes a week until the mother can walk 30 minutes (1.6 K.M/2100 steps) per day for 5days per week up to 16 weeks. Each exercise section begins with 5 minutes warm up and 5 minutes cool down. Walking can be monitored by pedometer step count. These were taught by the researcher through one to one session and asked to perform at home. Exercise adherence is ensured by recording in logbook by patients and telephonic sms alert and follow ups by investigator.

Pregnancy outcome among study and control group assessed after the delivery before the mothers discharge from the hospital and measured by the data collected from records of mother.

Group	Pre-test	Intervention	Reinforcement	Reinforcement	Post-test I	Reinforcement	Post-test II
	16-18 weeks of Gestational age	Immediately followed by pre test 16-18 weeks of GA	20-22 weeks of GA	24-26 weeks of GA	28-30 weeks of GA (12th week after intervention)	Immediately followed by posttest-1	32-34 weeks of GA (16th week after intervention)
Study Group	O1	X1	X2	X3	O2	X4	O3
Control Group	O1	*	*	*	O2	*	O3

*****-Routine antenatal care, routine checkup, investigations and follow up

2.4. Manipulation

After the selection of the antenatal women, they were given information on MOOC package on metabolic markers and clinical parameters, anxiety health related Quality Of Life and pregnancy outcome. MOOC package are sensitized the senses with created interest to learn and understand among antenatal women. These packages are made and given in shorter version in **Table 1**.

Table 1: Activities of manipulation

Steps/weeks of gestation	Interventions	Modality	Package used
Step l 16-18 weeks	Structured home based diaphragmatic breathing and walking exercise.	Video assisted teaching cum demonstration	Maternal overweight and obesity care
Step ll 20-22 weeks	Reinforcement of MOOC package	Video assisted teaching	Maternal overweight and obesity care
Step lll 24-26 weeks	Reinforcement of MOOC package	Video assisted teaching	Maternal overweight and obesity care
Step lll 28-30 weeks	Reinforcement of MOOC package	Video assisted teaching	Maternal overweight and obesity care

2.5. Outcome measures

Outcome measures include metabolic biomarkers, clinical parameters, anxiety levels, health-related quality of life, and pregnancy outcomes. Assessments will be conducted at various time points during pregnancy and post-delivery.

2.6. Data analysis

Data will be analysed using SPSS software. Descriptive statistics and inferential statistics, including two-way repeated measures ANOVA and independent sample t-tests, will be employed to analyse the data.

3. Results

The Nurse-Executed MOOC Package will significantly improve the health of antenatal women. Participants will show better control of metabolic markers and clinical parameters. Anxiety levels will decrease notably, while health-related quality of life will improve across physical, emotional, and social domains. Pregnancy outcomes will be more favorable in the intervention group, with reduced complications such as gestational diabetes and preterm births, along with improved neonatal health indicators.

4. Discussion

The findings of this trial will provide valuable insights into the effectiveness of the nurse-executed MOOC package in improving outcomes among antenatal women with overweight and obesity. If proven effective, the MOOC package could serve as evidence-based practice to optimize pregnancy outcomes and mitigate related health risks. Implementation of such interventions is crucial to addressing the growing burden of maternal obesity and improving maternal and child health outcomes.

5. Conclusion

The Nurse-Executed MOOC Package emerges as a promising and impactful intervention to enhance maternal and neonatal health. By empowering antenatal women with knowledge and support, it facilitates better control of metabolic and clinical parameters, reduces anxiety, and significantly improves health-related quality of life. Moreover, the intervention is associated with more favorable pregnancy outcomes, including lower incidences of gestational diabetes, preterm births, and improved neonatal indicators. These findings underscore the value of nurse-led digital health initiatives in transforming antenatal care and ensuring healthier futures for both mothers and their babies.

6. Source of Funding

Self-funded.

7. Conflict of Interest

None.

8. Ethical Approval

Ethical No.: IEC-NI/23/AUG/89/95,SCN/155/22-23.

References

1. Fitzsimons KJ, Modder J, Greer IA. Obesity in pregnancy: risks and management. *Obstet Med*. 2009;2(2):52–62
2. Lisonkova S, Muraca GM, Potts J, Liauw J, Chan WS, Skoll A, et al. Association between prepregnancy body mass index and severe maternal morbidity. *JAMA*. 2017;318(18):1777–86.
3. Marchi J, Berg M, Dencker A, Olander EK, Begley C. Risks associated with obesity in pregnancy, for the mother and baby: a systematic review of reviews. *Obes Rev*. 2015;16(8):621–38.
4. Girotra S, Malik M, Roy S, Basu S. Utilization and determinants of adequate quality antenatal care services in India: evidence from the National Family Health Survey (NFHS-5)(2019-21). *BMC Pregnancy Childbirth*. 2023;23(1):800.
5. Domínguez-Solís E, Lima-Serrano M, Lima-Rodríguez JS. Non-pharmacological interventions to reduce anxiety in pregnancy, labour and postpartum: a systematic review. *Midwifery*. 2021 Nov 1;102:103126.
6. World Health Organization. Obesity: preventing and managing the global epidemic. Report of a WHO consultation. *World Health Organ Tech Rep Ser*. 2000;894:i-xii, 1–253.
7. Moran LJ, Fraser LM, Sundernathan T, Deussen AR, Louise J, Yelland LN, et al. The effect of an antenatal lifestyle intervention in overweight and obese women on circulating cardiometabolic and inflammatory biomarkers: secondary analyses from the LIMIT randomised trial. *BMC Med*. 2017;15(1):1–2.

8. Loprinzi PD, Fitzgerald EM, Woekel E, Cardinal BJ. Association of physical activity and sedentary behavior with biological markers among U.S. pregnant women. *J Womens Health (Larchmt)*. 2013;22(11):953–8.
9. Haththotuwa RN, Wijeyaratne CN, Senarath U. Worldwide Epidemic of Obesity. In: *Obesity and Obstetrics*. Elsevier; 2020. p. 3–8. doi: 10.1016/b978-0-12-817921-5.00001-1.
10. Strom CJ, McDonald SM, Remchak MM, Kew KA, Rushing BR, Houmard JA, et al. The Influence of Maternal Aerobic Exercise, Blood DHA and EPA Concentrations on Maternal Lipid Profiles. *Int J Environ Res Public Health*. 2022 Mar 16;19(6):3550.
11. Phelan S. Pregnancy: a "teachable moment" for weight control and obesity prevention. *Am J Obstet Gynecol*. 2010;202(2):135.
12. Chopra M, Kaur N, Singh KD, Jacob CM, Divakar H, Babu GR, et al. Population estimates, consequences, and risk factors of obesity among pregnant and postpartum women in India: Results from a national survey and policy recommendations. *Int J Gynaecol Obstet*. 2020;151(Suppl 1):57–67.
13. Domínguez-Solís E, Lima-Serrano M, Lima-Rodríguez JS. Non-pharmacological interventions to reduce anxiety in pregnancy, labour and postpartum: a systematic review. M*idwifery*. 2021;102:103126.
14. Van der Merwe J, Hall D, Tisane M. Weight-related quality of life in obese, pregnant women in South Africa. *J Endocrinol Metab Diabetes S Afr*. 2017;22(3):43–6.
15. Beneventi F, Locatelli E, De Amici M, Cavagnoli C, Bellingeri C, De Maggio I, et al. Maternal and fetal Leptin and interleukin 33 concentrations in pregnancy complicated by obesity and preeclampsia. *J Matern Fetal Neonatal Med*. 2020;33(23):3942–8.

Cite this article: Divya TS, Rajeswari S, Syamlal S, Aruna S. Efficacy of nurse-executed MOOC package on metabolic markers, clinical parameters, anxiety, health-related quality of life, and pregnancy outcomes among antenatal women: study protocol of a randomized controlled trial. *Indian J Obstet Gynecol Res*. 2025;12(3):405–408.